E. Mark Amerian

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NEW SPECIES

AND

NOTES OF UTAH PLANTS.

BY

MARCUS E. JONES.

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NEW SPECIES AND NOTES OF UTAH PLANTS.

BY MARCUS E. JONES.

STANLEYA ELATA Jones, has been reported by F. V. Coville as far west as the Inyo Mountains in California.

LEPIDIUM ALYSSOIDES differs from *L. montanum* only in being perennial, and as the southern forms are perennial and the northern ones are not, I see no reason to keep up the species.

CLEOME LUTEA Hooker. In my specimens from the Moencoppa, Northern Arizona, the stipe is 3-16 inch long and the pedicel 7-16 inch long; the stipe is glutinous-hairy, seeds very warty on the back, and pod an inch long.

CLEOMELLA PALMERANA. Annual, erect and widely branching from the base, 2 to 10 inches high, glabrous throughout; leaflets 3, oblong-elliptical, obtuse, mucronate, petiole one inch or less long; bracts of earlier spikes often leaflike, simple, as large as the leaves and like them, and as long petioled. Flowers axillary and single, as well as spicate; pedicels 3 to 4 lines long, reflexed in fruit; spicate flowers subtended by minute subulate bracts, which are attenuated into hairs, these bracts are also surrounded at base by 2 to 4 hair-

like scales; sepals ovate or lanceolate, about ⅓ the length of the petals; petals 2 lines long, oblong-lanceolate, obtuse, veiny, orange-yellow, tipped with deep red in the bud, fading to light yellow with a white border; stipe one line long; fruit nearly truncate at top, with a triangular base, 4 to 5 lines wide and 2 to 2½ lines high, partition obovate, style ½ line long, seeds ovate, spotted, smooth, several in each cell; stamens slightly exceeding the petals.

Green River, Utah, May 9, 1890. Dedicated to General Wm. J. Palmer, than whom there is no one more interested in the scientific researches in Utah, or who has shown his interest in a more substantial way.

CERASTIUM ALPINUM, L., var. BEHRINGIANUM, Regel. My specimens of this plant from the Uinta Mountains, in Utah, are glandular and not "silky hirsute." These specimens were collected on La Motte Peak, August 11, 1888.

PETALOSTEMON SEARLSIÆ Gray. I suppose this is the name of the plant which I collected in Southern Utah and Arizona in 1890. It is perennial with shrubby lower stems, obovate to oblong-lanceolate leaflets, branched like *Hosackia Wrightii*, petals oblanceolate.

I have seen what seems to be ADOLPHIA INFESTA Meisner, from Northern Arizona, at Lee's Ferry. It has leaves 4 to 8 lines long, linear-oblanceolate, not at all mucronate, proper petiole absent or not over ½ a line long, stems densely pubescent with hairs which stand straight out from the stems, leaves with some pubescence though less dense, branches opposite only by accident.

ASTRAGALUS COLTONI. This belongs to the section *Homolobi* Watson, and is allied to *filipes* and *lancearius*. 1 to 2 feet high, many-stemmed from a thick woody root, branching at the base, erect or ascending; lower stipules scarious and connate, upper ones triangular, small and green, more or less united; leaves 2 to 4 inches long, petiole an inch long; leaflets about 3 pairs, distant, broadly linear, sometimes linear-oblanceolate, obtuse, uppermost leaves often reduced to the long, almost filiform rachis, which is generally broadened at the tip into the lanceolate terminal leaflet, and is therefore not articulated with the rachis; stems, and particularly the very long (6 to 12 inches) peduncle sulcate; young leaves ashy, otherwise the

whole plant is almost glabrous up to the flowers; raceme 2 to 6 inches long; flowers scattered, spreading, reflexed in fruit; pedicels ½ line long, black-hairy, 1 line long in fruit; calyx gibbous, black at base and nigrescent above with short black hairs, 3 lines long, cylindric-campanulate, teeth minute, subulate, 4 to 5 times shorter than the tube; flowers red-purple, about the color of *Hedysarum Mackenzii;* banner ½ longer than the keel; wings 1 to 2 lines longer than the keel; pods linear-oblanceolate, reticulated, chartaceous, very smooth and flat, very acute at both ends, nearly straight, 1½ to 2 lines wide, reflexed but seldom pendent, neither suture thickened; stipe twice to thrice the length of the calyx.

This plant differs from *A. lancearius* Gray, in the stipitate and narrow pods, minute calyx teeth, flowers, stipules, etc. It differs from *A. filipes* Torrey, in the red-purple flowers, very short pedicels, calyx tube, and shorter teeth.

This grows in the cañons of the Coal range at Castle Gate, on the eastern side, on talus. Collected June 22, 1889, in fruit, and May 11, 1890, in flower. Named for W. F. Colton, long identified with that region.

ASTRAGALUS ASCLEPIADOIDES. Stems stout, single or clustered from a woody root, 1½ to 2 feet high, erect or ascending, generally simple, glabrous and glaucous throughout except the minute scattered black hairs on the calyx; stipules very broadly-triangular, thin; petiole none, or only 1 line long and very flat; leaflet one, orbicular-ovate, cordate, obtuse or retuse, entire, veiny, thick and almost leathery, resembling those of *Asclepias cryptoceras*, 2½ by 2 inches, the internodes are shorter than the leaves so that the latter overlap, leaves scarcely reduced upwards; spikes very short (1 inch long), 6 to 8-flowered, arising from the axils of most of the leaves and equaling or slightly surpassing them; bracts ovate, acute, a line long; pedicels 1 to 2 lines long, stout; calyx slightly gibbous, cylindric, hyaline, white or ochroleucous, with a few black hairs, 5 lines long; teeth triangular, less than a line long, black-hairy; upper side of calyx cleft deeper than the lower, and the teeth also somewhat unequal; corolla ochroleucous with a purple spot at tip of keel, about twice as long as the calyx, wings barely exceeding the keel, and the banner a line or two longer; flowers erect; pods one-celled, elliptical or oblong-ovate, barely acute, coriaceous, nearly round in cross-section, both sutures slightly thickened internally, the dorsal

suture impressed sufficiently to make the pod narrowly sulcate, many-seeded, hardly an inch long and 6 lines wide; stipe 6 to 10 lines long. This is an anomaly in the genus so far as American plants are concerned, but I cannot convince myself that it is a new genus or anything but an Astragalus. The leaves and general appearance of the plant resemble the glaucous round leaved species of Asclepias; the flowers resemble those of *Hosackia Torreyi* collectively, and individually those of *A. Drummondi.* I propose a new section, *Pachyphylla,* for this plant, characterized by thick unifoliate leaves and one-celled, stipitate pods.

This grows on sand-bars along the Price River, in Eastern Utah, elevation 5,000 feet. It was first collected by me in flower and fruit in September, 1888, and also at Green River, Utah, along the river, in flower, on June 21, 1889.

ASTRAGALUS SABULOSUS. Many stemmed from a thick woody root, less than a foot high, stout, ashy pubescent throughout; young leaves silvery, older ones glabrate; stems and peduncles nearly smooth, sulcate; stipules large, broadly triangular, lower barely free; lower leaves very small, 1½ to 2½ inches long, the petiole an inch long, sulcate, the leaflets 2 to 3 lines long, obovate or rounded, obtuse, 3 to 4 pairs; upper leaves 3 to 4 inches long, leaflets obovate-cuneate to almost diamond shaped; the broader ones obtuse and apiculate and the others acute, not exceeding an inch long by 5 lines wide; peduncles 3 to 4 inches long, loosely 4 to 8 flowered; bracts a line or two long, equaling the black-villous stout pedicels, calyx nigrescent with black hairs, hyaline, cylindric-campanulate, 6 lines by 3 lines, teeth subulate and ¼ the length of the calyx; corolla ochroleucous, twice as long as the calyx, keel and wings equal, the banner ½ longer, keel darker tipped, flowers reflexed; pod barely stipitate, nearly 2 inches long by 6 lines wide, straight one-celled, very abruptly acute, contracted at base, thick, coriaceous, minutely pubescent and hoary when young, neither suture impressed nor conspicuously thickened. Allied to *A. Pattersoni* and *A. procerus;* differing from the former in the blunt, large, almost sessile, pubescent pods, short calyx-teeth, few and broad leaflets, large stipules, and low habit; and from the latter in its low habit, large stipules, few leaflets, few flowers, shorter and narrower calyx-teeth, and larger pod.

Collected May 2, 1890, at Cisco, Utah, on gravelly soil near Grand River.

ASTRAGALUS BISULCATUS and HAYDENIANUS are two species that I have studied much, and have come to the conclusion that they are hardly distinct. The only characters that hold still are the light colored flowers and the slender habit as distinguishing *Haydenianus* from *bisulcatus*. I doubt not that these will disappear with further study, or rather search; until that time comes, however, it will be best to keep up the species. The two varieties given below will be useful till the species is superseded.

Characters common to both *bisulcatus* and *Haydenianus*. Plants perennial from a woody root, many stemmed, 2 to 3 feet high, branching toward the top; lower stipules connate and scarious, upper broadly triangular and acute; stems, petioles and peduncles grooved; leaflets when fully developed nearly or quite an inch long; pedicels hairy, 2 lines long; calyx saccate, cleft on the upper side, hyaline, ochroleucous, lobes subulate, unequal; flowers with a very strong snake-like odor, horizontal, reflexed or pendent in fruit; keel purple tipped; banner veined below; pods semi-circular in cross-section, deeply bisulcate on the ventral side, ventral suture prominent, pod more or less rugulose-veiny; stipe as long as the calyx; proper peduncles equaling the leaves; spikes elongating in fruit.

ASTRAGALUS BISULCATUS Gray. Stout, nearly erect; leaflets broadly to narrowly lanceolate, obtuse, often apiculate, less than an inch long, 8 to 13 pairs; plant minutely pubescent even to the pods, but stipe glabrous and pedicels strigose; bracts 2 lines long, ovate-acuminate; pedicels 1 to 2 lines long; calyx 2 lines long and wide exclusive of the lobes, lobes 1 to 1½ lines long; flowers purple, 6 lines long; wings ½ line longer than the keel; banner 1 line longer than the keel and erect; pod narrowly oblong, quite acute at tip and obtuse at base, straight, 6 by 2 lines long and wide; spikes dense in flower; peduncles longer than the leaves.

ASTRAGALUS HAYDENIANUS Gray. (This will become *A. bisulcatus* var. *Haydenianus* when merged into that species). Typical form. Slender stems erect; pubescence ashy; calyx-teeth much shorter than the tube; flowers 3 to 4 lines long, white, pods rugulose-veiny transversely; spikes elongated, virgate; pods oval, very obtuse at both ends, 2 to 4 seeded. This abounds in southwestern

Colorado and northward to the Grand River, and doubtless occurs in eastern Utah south of the Uinta mountains.

ASTRAGALUS HAYDENIANUS Gray var. MAJOR. Subdecumbent or nearly erect; leaflets 7 to 9 pairs, narrowly elliptical to linear-lanceolate, very obtuse, apiculate; whole plant nearly glabrous, but pods more pubescent and pedicels villous; bracts narrowly lanceolate, acuminate, longer than the pedicels; calyx deeply cleft, 1½ lines wide and long, exclusive of the lobes, with scattered black hairs and black-ciliate throat; lobes with a deltoid base and 1½ lines long or less; flowers 6 lines long, cream-white; banner ascending; claws of wings conspicuous; flowers twice as narrow as *A. bisulcatus;* pods spreading but seldom pendent, narrowly oblong-elliptical, rugulose-veiny, straight, or generally curved, 5 lines long by 1½ lines wide, shortly acute at both ends, ventral groove not so deep and the dorsal also a little impressed.

Collected June 20, 1890, in flower and fruit at Johnson, southern Utah, on alkaline flats, or meadows.

ASTRAGALUS HAYDENIANUS Gray, var. NEVADENSIS. Tall, 2 to 3 feet high; leaflets 8 to 10 pairs, obovate to ovate-oblong, very obtuse or retuse; whole plant nearly glabrous, but calyx and young pods pubescent with white hairs; bracts rather broadly lanceolate and scarcely acute, shorter than the shortly-white-villous 2-line-long pedicels; calyx a little over a line long and wide exclusive of the lobes; lobes nearly equal in length and shorter than the tube; flowers 4 lines long and 1 line wide, nearly white, subverticillate and very numerous, soon reflexed; banner reflexed, shorter; wings scarcely equaling the keel; pod not evidently rugulose, short-pubescent, about 5-seeded, papery, nearly or wholly pendent, barely acute at each end, elliptical, 4 lines long and 2 lines wide, or smaller; proper peduncles barely as long as the leaves; spikes very long and slender, often 8 inches long.

Collected June 14, 1882, at Palisade, Nevada, in Meadows. I distributed this as "Astralagus n. sp.?" in my sets of 1882.

ASTRAGALUS ARGILLOSUS. Allied to *A. flavus.* Cæspitose; root short-lived, perennial or biennial; stems 1 to 8 inches long, ascending; whole plant 6 to 12 inches high, hoary throughout with close-pressed, rather long hairs; stipules connate, large, with long subulate tips; peduncles subscapiform, as long as the leaves; leaves 2 to

4 inches long, petiole grooved, 1 to 2 inches long; leaflets 4 to 6 pairs, narrowly to oblong-linear, acute or apiculate, greener than the rest of the plant, 1 to 1½ lines long; spikes short and very dense, 1 to 2 inches long, erect; flowers almost sessile; bracts as long as the calyx and lobes, subulate lanceolate, green but with a few scattered, long, spreading hairs on the back, and with many on the edge; calyx short-campanulate, less than 2 lines long; lobes 4 lines long, subulate from a broad base, calyx white with very long appressed hairs, which toward the top and on the lobes are widely spreading, flat and twisted, and with a pustulate base, making the calyx lobes resemble the sepals of some shaggy species of Krynitzkia—the hairs are, however, soft; corolla short; keel purple-tipped, about equaling the calyx lobes; wings a line longer; the banner 2 lines longer, purple, broad, dark-striate toward the top; pod strictly sessile, white with long appressed hairs, ovate or oval, scarcely equaling the calyx lobes, blunt but apiculate, obcompressed till the cross-section at base is almost linear, dorsal suture being deeply impressed at base, and very prominent toward the tip, pod flat on the bottom and ventral suture inconspicuous, pod 1-celled. The spikes resemble some species of Oxytropis, but the keel is very blunt and short. This plant differs from *A. flavus* in the shaggy calyx, purple flowers, short sessile pods, and long calyx lobes.

May 9, 1890, at Green River, Utah, on clayey soil.

ASTRAGALUS CONFERTIFORUS Gray, was improperly raised to specific rank by Dr. Gray. It should remain as the var. *candicans* Gray of *A. flavus*, for I have abundant specimens with the light yellow flowers of *A. flavus* and a varying pod connecting it with *A. flavus*. June 2, 1890, at Cisco, Eastern Utah.

ASTRAGALUS WARDI Gray, is a good species, and is perennial and not annual. I collected it near where Ward found it, at Panguitch, Utah, on June 24, 1890. It grows on gravelly soil.

ASTRAGALUS SILERANUS. Perennial; stems many, 2 to 3 feet high, weak, straggling upward among the bushes like *Vicia Americana;* whole plant whitened with hairs standing straight out from the surface of the leaves, etc.; nodes long; leaves 3 to 4 inches long, with a very short (½ inch) petiole; leaflets about 9 pairs, about 8 lines long, oblanceolate or oblong, with a contracted base and a generally deeply notched apex, sometimes truncate; stipules trian-

gular, rather large, connate only at base; peduncles 3 inches long, slender, spreading at right angles to the stem, or nearly so; flowers subcapitate, 10 to 15, sessile, light yellow, small, less than 4 lines long; calyx 2 lines long, campanulate, equaling the subulate lobes which come within 2 lines of the length of the flowers; flowers with keel nearly straight and dark tipped; banner and wings but little longer than keel; pods not reflexed, sessile, purple-spotted, short-pubescent, apiculate, oval, 8 lines long, inflated, chartaceous, cross-section nearly round, dorsal suture inflexed nearly a line deep, ventral scarcely any, neither suture thickened, pod 1-celled, straight, generally only one or two maturing on a peduncle.

This plant has the habit of *A. humistratus*, and is very readily mistaken for it. The pods resemble those of *A. filifolius*, var. *pictus*. It belongs near to the *Lotiflori*. Collected by me on June 23, 1890, in Sink Valley, southern Utah, at about 7,000 feet altitude, among the underbrush along the road. I take pleasure in dedicating it to my friend, A. L. Siler, who has labored under the greatest difficulties in collecting the flora of that inhospitable region, and who, though he has never seen this plant, has collected many rare and some new species, and has never had due recognition.

ASTRAGALUS DESPERATUS. Cæspitose from a woody root, strigose-pubescent throughout; stipules large, free, ovate to orbicular, scarious, densely imbricated on the very short stems which afterwards elongate somewhat, leaves 2 to 4 inches long, petioles about an inch long, earliest leaves generally small and leaflets 1 to 4 lines long, oval to orbicular, later leaflets from obovate and obtuse to narrowly lanceolate and very acute at both ends, seldom exceeding 6 lines long, often much less, about 7 pairs; peduncles exceeding the leaves, oceasionally 6 inches long, scapose, many flowered; flowers subcapitate at first, later they are racemose, nearly sessile (pedicel much shorter than the ovate bract which is 2 lines long), soon reflexed, purple, 6 lines long; wings slightly exceeding the very blunt, straight keel; banner broad, a line longer than the keel, deep-purple as well as the keel and wings, erect, conspicuously veined at the top; pod sessile, reflexed, thin-chartaceous, falcate, acute, about 6 lines long, triangular in cross-section, base cordate by the intrusion of the ventral suture, 4 lines broad, long-hairy. Allied to the *Inflati*. The flowers and general appearance suggest forcibly *Oxytropis Lamberti*.

This grows in the sand along or near Grand River, in eastern Utah. Collected May 2, 1890. The name indicates the state of mind a person is in who tries to invent a name for a new species of this immense genus without getting one already occupied.

PSORALEA CASTOREA Watson and *C. mephitica* Watson, are identical, I think, as the characters given for mephitica all appear on plants with the same root as *P. castorea*. These plants seem to grow in large patches and the thickened roots go straight down several feet and then branch off horizontally and appear to be all connected. I will add more about this Psoralea at another time.

CERCOCARPUS LEDIFOLIUS Nuttall. Since I became convinced that the *C. intricatus* of Watson was only a form of this species, some ten years ago, I have been specially interested in this genus, and last year I erected a new species in it. This year I have had the best of opportunities for an extensive study of the genus in western Utah and eastern Nevada, and have collected multitudes of forms which I think will clear up this very unsatisfactory genus.

C. ledifolius comes down to an altitude of 7,000 feet in the Wasatch mountains and runs up to over 8,000 feet altitude. It is a densely branched and scrawny shrub on rocky places, and where the moisture is greater and the soil better it straightens up and is 20 feet high and tree-like. In eastern Nevada where the moisture is far less it grows at 8,000 to 9,000 feet altitude, and is generally shrubby. Near the East Humboldt mountains it occasionally comes a little lower toward the edges of the lower foothills, but never in the valleys which are here seldom less than 6,000 feet above the sea. I have seen the trees 40 feet high there; with a trunk 1½ feet in diameter and so well formed as to make good posts. The leaves and flowers do not vary much except at the lowest altitudes.

CERCOCARPUS LEDIFOLIUS Nutt. var. INTRICATUS Jones (*C. intricatus* Watson), was first found at about 6,000 feet altitude in the Wasatch mountains in American Fork Cañon, by Watson, on the face of precipitous cliffs where it still abounds. I botanized there in 1880 and by going up the cañon to where *C. ledifolius* occurs at 8,000 feet altitude I found a complete transition to *C. ledifolius*, and therefore reduced the species to *ledifolius*. The plant at the lower altitudes was a tangled shrub 2 to 3 feet high, with revolute, linear, smooth and shining leaves on the upper side, small flowers and

fruit. It was at first taken for *C. breviflorus*, Gray Pl. Wright, by Watson. The characters relied upon as specific were the pubescence, size of flowers and fruit. and the shape of the leaves. Since I have never seen *C. breviflorus*, and since Prof. Watson had not at that time yielded his *C. intricatus* I was induced to lay too much stress upon those characters in the new species, which I called *C. Arizonicus* last year, which is a better species than *C. breviflorus* or *C. intricatus*. My observations this year show that no one of those characters is of any value whatever. At higher altitudes in all the mountains at the lower edge of the field of *C. ledifolius* there is always a transition to *C. ledifolius*, and at the lowest altitudes where the var. *intricatus* ceases (5,000 feet above the sea), every conceivable connecting form is found that by itself might be taken for *C. Arizonicus* and *C. breviflorus*, so far as my field of observations goes. Should there be any valid character left to keep up these species I will announce them hereafter, but I see none now. This will clear up the genus by reducing *Arizonicus*, *breviflorus*, and *intricatus* to the var. *intricatus* of *ledifolius*, and leave only the two species *C. ledifolius* and *C. parvifolius* in the United States, as recognized species. It will extend the range of *C. ledifolius* from Idaho and California to southern Nevada and eastward to the borders of Colorado and southward to northern Arizona and New Mexico, where it is represented exclusively by the var. *intricatus*. The range of the variety is from New Mexico to southwestern Nevada and north to Idaho, in dry and low situations among rocks.

Since writing the above I have received from Mr. Colville, of the Department of Agriculture, a leaf from the type specimen of *Cercocarpus breviflorus* Gray, and wonder how it could ever have been confounded with *C. ledifolius* var. *intricatus* by any one who had ever seen it. The description of *C. breviflorus* as given in Plantæ Wrightianæ is not accurate as is shown by this specimen. *C. breviflorus* is clearly only a variety of *C. parvifolius*, a starved form exactly analogous to the var. *intricatus* of *C. ledifolius*. I should not hesitate to reduce it as a variety of *C. parvifolius* and call it *C. parvifolius* var. *breviflorus* Colville, but I do not feel at liberty to publish it as such, but simply mention it so as to show to whom the credit is due—to Mr. Colville—for placing it where it really belongs. What I have said above needs little change except to take *C. breviflorus* out of the synonymy of *C. ledifolius* and put it into that of *C. parvifolius*.

PEUCEDANUM LAPIDOSUM. Loosely cæspitose from long branching roots which spread several feet under ground, the tops of whose branches bear the stems; top of root covered with the remains of old leaves; stems 1 to 4 inches long, sheathed with one to two striate-veined, scarious, inch-long bracts; on the top of these stems is a cluster of glabrous leaves, 2 to 4 inches long and an inch wide, which are bipinnate; lower pinnæ stalked; lower pinnules ovate and incised, upper ones entire, oblong to ovate, acute, 1 to 2 lines long; petioles 1 inch long, lowest ones greatly enlarged at base and striate-veined; peduncles arising from amongst the leaves; there is often a very short node like the lower part of the stem above the first tuft of leaves from which the longest (6 to 8 inches) peduncles arise; flowers white, very small; petals nearly round, involucre none; involucels of several linear, not scarious, rather long bracts; rays nearly equal, ½ inch long, several; pedicels 2 lines long; fruit oblong-oval, emarginate or retuse at both ends, 3 to 4 lines long and 2 to 2½ lines wide; wings rather thick, ½ as broad as the body; intermediate ribs winged at base and tip but not in the middle of the fruit; oil-tube one in each interval, large, 8 to 10 on the commissure, these latter tubes sinuous, often interrupted and clustered next the margin, small; inner face of the seed concave; stylopodium depressed; whole plant glabrous throughout, 4 inches to a foot high, a delicate, heavy-scented plant, growing under rocks like ferns, spreading flat on the ground, or erect in more exposed situations. Allied to Pseudocymopterus, C. & R., but I doubt the validity of that genus.

CYMOPTERUS DECIPIENS. Near to *C. glomeratus;* flowers golden-yellow; leaves similarly divided, but the segments are less divided, blunt or barely acute and oblong, while those of *glomeratus* are narrow and acute; involucres none or of several long linear bracts; involucels similar, but the larger central ones entire or with a single tooth very rarely, those of *glomeratus* are often palmately lobed; rays often an inch long, but pedicels very short; carpels similar to *glomeratus*, but the wings very thick and spongy in the middle, with an abruptly contracted thin edge and also very thin next the seed, while those of *glomeratus* are thick next the seed and very thin on the broad edge. This ranks close to *C. glomeratus*, but differs in the rays, spongy wings of the fruit, blunt-lobed leaves and yellow flowers. The oil tubes are the same as in *C. glomeratus*. It grows

flat on the ground in sand, at 5,000 feet altitude. May 2, 1890, at Cisco, in Eastern Utah.

BIGELOVIA GLAREOSA. Many-stemmed, from a shrubby base, about a foot high; leaves linear, not involute, larger at tip, reduced to oblong bracts on the flowering branches; flowers corymbiform, 5 in each head, yellow; involucral scales 5-ranked and 4 in each rank, lowest very small, upper ones successively longer, all very obtuse, somewhat keeled, the upper ones with a conspicuous, thickened, yellow tip, upper scales linear, lower ones ovate, all sparsely lacerate on the edge and covered with a white scurf; akenes glabrous, about equaling the longest scales; corolla lobes linear-lanceolate, tips glabrous, anther-appendages lanceolate.

This is allied to *B. leiosperma*, but differing from it in its rather broadly linear not revolute leaves and narrow corolla lobes. The plant is probably woolly when young. It is conspicuous for its flowers (½ inch long), involucral scales, and for growing in dense clumps.

Marysvale, Southern Utah, but north of the rim of the Great Basin at least one hundred miles. October, 1890. It grows on the gravelly mesas of the Sevier River at 6,000 feet altitude.

ASTER VENUSTUS. Allied to *A. Wrightii*. Shortly floccose-tomentose up to the ashy-canescent involucre, the hairs on the involucral bracts short, flat and broad, and jointed so as to resemble rattlesnake rattles; leaves all entire, oblanceolate or lowest spatulate sometimes, scarcely petioled, 3 inches or less long, generally apiculate, larger ones indistinctly 3-nerved, scarcely reduced upwards; stems many, erect, stout, simple, shrubby at base; peduncles 1 to 2 feet long, monocephalous, leafy for the first 6 to 8 inches, then naked; involucral scales oblong-ovate and abruptly long-acuminate above the middle, not scarious, in about three series; rays white or light purple, linear-oblanceolate, 2 lines broad and an inch long, scarcely acute; pappus of unequal, stiff bristles; akene silky, with very slender, long, straight hairs.

This plant differs from *A. Wrightii* in not being in the least viscous pubescent, the bracts are not viscous nor scarious margined, the tips barely surpassing the disk. It grows in the deserts and near dry rocks. It is one of the most showy plants of the genus.

May 2, 1890, at Cisco, Eastern Utah, and also in 1884, at or near Grand Junction, Colorado.

ERIGERON EATONI Gray, is a very variable plant, and occurs in varied situations from 6,000 feet to 8,000 feet altitude. It was distributed by me years ago as *E. tener*.

ERIGERON FLAGELLARIS Gray, I have with truly perennial roots. May 26, 1890, on the Pinal Mountains, Arizona.

TOWNSENDIA ARIZONICA X INCANA. Bracts lanceolate, very acute, heads ½ inch long; pappus of ray scarcely shorter than that of the disk, heads sessile or pedunculate; leaves 1 to 1½ inches long. I doubt that this is a hybrid, but it destroys one of the two species. I do not recall which is the older. Collected on the Little Colorado, in northern Arizona, June 9, 1890.

GREENELLA ARIZONICA Gray, I have with all the upper part of the plant glutinous, as well as the heads. It is not branched at base; stems striate; leaves all linear (root leaves gone).

ANTENNARIA DIOICA Gærtn. var. CONGESTA, DC., seems to be a good species; the supposed rosulate leaves are outer bracts closely united. It grows in mats an inch or two high; the inner scales have a tendency to livid in color; they are toothed or lanceolate at tip; outer bracts nearly as long as the innermost, oblong or oblong-lanceolate, acutish, passing into leaves. June 4, 1890, on the San Francisco Mountains, northern Arizona.

ENCELIA FRUTESCENS Gray, I have with glandular heads and peduncles June 10, 1890, on the Little Colorado River, northern Arizona.

VERBESINA SCAPOSA. Anther appendages ovate-lanceolate; style branches conical, hispid; corolla tube narrow at base and there a line long, then abruptly enlarged to nearly a line wide, and cylindric-campanulate; lobes ovate, short, yellow; anthers with a dark line running down the center; heads ¾-inch high and 1 to 1½ broad; proper scales imbricated in about two series, lanceolate, outer ones wider, ½-inch long, all appressed, green, stiff; chaff subtending, the outer flowers green on the back and tip and short-hispid, with hyaline, conduplicate margins, inner ones all hyaline except the green hispid tip, all the chaff longer than the flowers; akenes obovate-oblong, exterior triquetrous, inner flattish, long-villous; margin narrow on the body of the akene but nearly a line high on the top, and white, deeply notched; pappus none; rays none; heads mono-

cephalous or sometimes geminate; peduncles a foot or less long, striate, naked; leaves clustered at the top of the root which arises from a large tuber 3 to 5 inches beneath the ground; leaves broadly ovate, with a cuneate base, resembling those of *Lappa minor*, decurrent into the margined, striate-veined, 1 to 4 inch long petiole, veins of the leaves 3 to 5; pubescence hispid-strigose throughout, most abundant on the petioles and bracts.

Though this curious plant differs widely from any known species of Verbesina, I am inclined to place it there rather than erect a new genus upon it. It is a conspicuous plant on the sandy deserts near Grand River, in Eastern Utah. May 2, 1890, Cisco.

BAHIA DESERTORUM. Many-stemmed from a rather lignescent, branching root which is covered with old leaf-petioles. Leaves all lanceolate with a contracted base which is decurrent into the 1- to 4-inch long, margined petiole. Leaves plantain-like 3 to 5-nerved, petiole about equaling the blade, leaves mostly clustered at the base and lower part of the stem; stems branching above and branches 1 to 3-cephalous; upper leaves reduced to nearly sessile, very acute, lanceolate, or narrower bracts. Whole plant scabrous, glandular above. Heads when single long pedunculate, 6 lines wide and 7 lines high, exclusive of the golden-yellow, cuneate, 3-toothed, inch-long rays. Scales ovate-oblong, abruptly acuminate, in two series equal, 4 lines long. Tip of style branches short-triangular and barely acute. Akenes linear, sparsely hairy; pappus ¼ the length of the akene, of broad erose, and lacerate, truncate scales, with a decided midrib which stops considerably short of the tip; pappus of the ray inclined to be shorter and with an occasional lanceolate scale twice as long as the others. Tube of the corollas glandular, that of the disk abruptly enlarged above the pappus and campanulate-cylindric.

This plant belongs near to the section Platyschkurria, Gray, but is really intermediate between that and the preceding section, though it is hardly a true Bahia in habit. Collected May 2, 1890, at Cisco, Utah, on the sunny sides of rocky hillsides on the desert.

ACTINELLA COOPERI Gray, is biennial, June 19, 1890, Buckskin Mountains, on the edge of southern Utah.

ASCLEPIAS BRACHYSTEPHANA Eng., really comes in near *A. stenophylla*, the wings of the anthers fit there, and the pollinia are arcuate-lanceolate from a rounded base.

GILIA HOWARDI. Many stemmed from a perennial root, very leafy to the top; lower leaves obovate with a cuneate base and decurrent into the petiole, leaves longer than the internodes; upper leaves 3 to 5 lobed with broad ovate lobes, not acerose; uppermost leaves bractlike, entire, ovate or lanceolate, contracted at base, nearly equaling the flowers; whole plant sparsely pubescent with glandular, woolly hairs; flowers loosely clustered; calyx nearly sessile, campanulate, 3 lines long, lobes subulate-lanceolate, longer than the tube; corolla purple, an inch long, tube very slender, but rather abruptly enlarged at the campanulate mouth, lobes 2 lines long, rounded, obtuse, erect; stamens much exserted.

This plant has the habit of *Gilia depressa*, Jones, as to the leaves and heads. Collected by Prof. Orson Howard on the mountains of southern Montana, at rather high altitudes, in 1884. The plant seems to be decumbent.

GILIA LONGIFLORA Don., has the pods ½ an inch long far surpassing the calyx.

GILIA MINIMA Gray, I have from Mormon Lake, near Flagstaff, Arizona, with the corolla 2 lines long; calyx 3 to 4 lines long, tips acerose and very unequal. June 4, 1890.

PHACELIA INTEGRIFOLIA Torrey var. PALMERI Gray, I have with leaves not subcordate. June 16, 1890, at Lee's Ferry, northern Arizona.

KRYNITZKIA GLOMERATA, var. ACUTA. Nutlets raised into sharp, wing-like, toothed ridges, and intervening spaces muriculate. Collected May 2, 1890, at Cisco, Utah.

ERIOGONUM THOMASII Torrey? Leaves tomentose on both sides, less so on the upper, orbicular-cordate, blade ½ an inch long; plant dichotomous just above the base, glabrous above the leaves; sepals oblong, obtuse, reddish or yellow with a reddish midrib. June 10, 1890, on the Moencoppa, northern Arizona.

ERIOGONUM THURBERI Torrey. I have this with leaves generally ovate with a cuneate base; plant glandular at the nodes; involucres angled and center of the outside sepals scarcely at all hairy. The leaves are white-woolly below, more glabrous above, blade ½ an inch or less long, petioles shorter; plant 3 to 6 inches high. May 24, 1890. Mescal Mountains, central Arizona.

HESPERANTHES ALBOMARGINATA. Six inches to a foot high; roots slender, many, long, root stock at base of stem thickly covered with long coarse fibers, inside of these are several 1 to 3-inch long, scarious sheaths; leaves all at the root, as long as the stem, very narrow and onion-like; lower part of stems and leaves occasionally roughened, otherwise smooth; stem 6 to 12 inches long and erect; flowers racemose-spicate, 1 to 3 under each ovate, acuminate, scarious bract which is 6 lines long; flowers on 6-line-long, erect, stout pedicels, and pedicels jointed above the base; flowers white and scarious with three very prominent green nerves, which give the flowers a greenish tinge; segments of flowers lanceolate to oval and obtuse, 3 to 6 lines long, ⅓ longer than the curved, smooth and sparingly hairy filaments; anthers sparingly hairy; slender style elongated, enlarged and capitate at tip; capsule oblong and bluntly lobed; lowest bract sometimes flowerless and an inch or more long.

Collected May 9, 1890, at Green River, eastern Utah. This is one of the most evanescent of the flora there, and very attractive. It grows on the most desert places, generally in sandy clay.

CALOCHORTUS FLEXUOSUS Watson, is described as having no bulbiferous stems while the opposite is the case. It abounds from the base of the Book Cliffs southward, and southwestward into Arizona and California. The stems are remarkable for their sinuous character.

PINUS MONOPHYLLA Torrey & Fremont, var. EDULIS. Leaves 2 to 3, entire margined, more slender than the typical form; staminate involucre 4-leaved; cones about one-half smaller than type.

There is no reason why this plant should continue to rank as a species, as it is but a 2- to 3-leaved variety of *P. monophylla.* Whether this species shall be reduced to *P. cembroides* I leave for the future to decide. As long as ten years ago I found plants with both single and double leaves on the same branches. About the same time I met Prof. J. S. Newberry who told me he had seen the same thing. At odd times I found similar leaves without any particular hunting, at various places. Last year while at Tintic, Utah, I made a careful examination of a large number of trees and found many trees with the two- and one-leaved forms about equally distributed on the same plant. I collected many specimens of them

and now have them for exchange with those interested in the Coniferæ who have plants which I desire. The two-leaved form grows in more moist places than the typical plant, and so far as my observation goes does not occur at all to the west or south in dry situations. I have never seen it in the Wasatch; it is doubtless too moist for it there. The var. *edulis* does not grow in Utah so far as I know, but I have collected it in various places in Colorado.

ASTRAGALUS CONFERTIFLORUS Gray, I have with calyx teeth longer than calyx and yellow or cream-colored flowers, which tends also to show that it should be called a variety of *A. flavus*, as given above. These specimens are from House Rock, northern Arizona, on the edge of Utah, 1890.